There are a large number of fishes in the Middle Atlantic area that support minor fisheries and contribute largely to general fisheries. These fishes include the scup, butterfish, tilefish, sea bass, tautog, and many others. These fishes, individually, do not justify the status of a separate investigation. However, this laboratory must advance our knowledge of these species and keep up-to-date records on their relative abundance, changes in distribution and interactions with other species of special interest.

An initial goal of this is to determine the salient life history facts of each of these species and to develop the proper age reading techniques.

	Mass.
	Woods Hole,
Scup, et	
Investigation: Scup, et al	Biological Laboratory:

	Est x	-		Fisca	Togh Le	5.		
Project Title	Cost	57 58	59 6	19 09	L_	63	179	65 \$ 56
✓ 1. Age and growth problems	26,0	17.33.4	0.8	1.4 3.	1	1	1	1
△ 2. Migrations of various scup stocks	125.2	91	416.416	4 06.	916.0	12.	010,219	9.411
N 3. Validation of scup aging methods	2.2	1	0.8 1	4	1	1	1	1
i	2.2	1	0.8 1	4	;	-		1
▼ 5. Validation of tilefish aging methods	3.8	1	口	4 1.6	-	1	-	1
1	4,0	1 1 1 1 1	1.01	4 1.6	3	1		
7. Age and growth of scup of southern New England	10,8	1 1	1	2.	7.2.7	5.4		-
Age and	10,3	1	-	- 2.7		5.0		-
Age and growth of tilefish	8.7	! !	1	- 11.0		0	1	1
10 Skate aging techniques	15.5	1 1		- -i	3 2.6	5.0	6.3	-
11 Tilefish fecundity, spawning and young	22,8	1	-	1	2.6	6.7	7.06	ъ
	28,8	1	j	1	2.8	5.0	5, 3, 6	6.59.2
1	22,3	1	1	1	1	1	5.3 7	8:9.2
11 Are and anounth of alcated	21.5	1 1		1	1	1	5, 37	7
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Investigation Total	324.	317. 19.	9.820.623.4	31	2 32, 0	32.0 44.144.645.445.	14° 645	445
Annual Review							A	Date
Inheretory Regional or Area Office Vashi	Vashington Office	Prepared by:		Robert L. Edwards	L. Ed	wards		8/6/59
		Recomme	Recommended by:	••				Date
		Labe D	Lab. Director Herbert W.	Herber	rt W.	Graham	Ī	8/6/59
THE PARTY OF THE P		Reg, o	Reg, or Arca I	Dir.	23c 16 4	17/1	Y	となって
		branch Chief	Chicf		77	1, 77	2/27	129
		Approved	d by:	>			,	
				Division	n Chief	for	Director	0

*Total needed by Laboratory for Froject in theusands of dollars.

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

LITE IA

Research Project Outline

Title of Project	: Age and growth problem	s	
Investigation Ti	tle: Mid-Atlantic groundfi	sh, scup et al	
Investigation Ch	ief: Invest. not yet activat	ed	
Project Leader:	R. L. Edwards	F. R.B.	GS-12 Grade
Assistants: (Ti	tle and Grade)		
Collaborators:			
tion of growth,	tion: This is research on goodesigned to improve our kethat are involved in changi	nowledge about growth	rates and environ-
Objective: To im	aprove techniques of growt	h analysis.	
Method of Proced	lure:		
Phase 1: Devel	lopment of mathematical m		
	the territory of	Some tree Parkers	have a maked
			A. H.

Phase 3:

Estimated Casts: Tota	l Needed by Labor	atory for Complete Pre	jcet <u>26.0</u>
	FY <u>1959</u>	FY <u>1960</u>	FY <u>1961</u>
Personal Services Other Expenses:	0.5	0.5	2•0
Within Project	0.1	0.1	0.1
Lab, Adm. & Ser.	0.2	0.8	1.0
Lab. Total	0.8	1.4	3.1
Regional Office Washington Office	.008	.014	.031
Total			
Recommended Source of F Estimated Date of Compl		(S-K, Reguler, Contribu	
Recommended by: Originator R.	Edwards		<u>Date</u> 8/6/59
Investigation Ch ief	R. L. Edwards		8/6/59
Laboratory Director _	Herbert W Graha		8/6/59
Regional Director	Joseph F. Jun	inchar	8/19/59
Branch Chief Approved by:	V , MAE		12-24-5
Division Chief for Di	rector 110	<i>t</i> (1-2-6.
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Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Migrations of vario	us scup stocks	
Investigation Title: Scup and other		ish
Investigation Chief: Edwards (thru]	Industrial) Invest. no	t yet activated
Project Leader: L. M. Lawday	F. A. Title	GS-5 Grade
Assistants: (Title and Grade) R. R. Stoddard, Statistical Cl	lerk. GS-5 (part-time	۵)

Collaborators:

Paul E. Hamer, N. J. Dept. of Conservation Dr. A. Perlmutter, N. Y. State Dept. of Conservation

Need for Information: The scup has played an ever-increasing role in groundfish landings form the middle Atlantic area since the expansion of the winter trawl fishery. It is apparently made up of at least 3 distinct stocks. Any management possibilities must be based on an adequate understanding of the total population and its units.

Objective: To define migratory patterns of scup as they relate to possibly separate stocks and to hydrographic conditions.

Method of Procedure:

Phase 1: Tagging of fish off N. J. (Hamer), in Long Island Sound (Perlmutter), off Pt. Judith (FWS), off Newport (FWS) and off Woods Hole (FWS).

Phase 3:

Estimated Costs: Tota	l Needed by Labora	tory for Complete Project	125•2
	FY <u>1959</u>	FY <u>1960</u>	FY 1961
Personal Services	1.0	1.0	4•9
Other Expenses: Within Project	0.4	1.0	2.0
Lab. Adm. & Ser.	15.0	14.4	10.0
Lab. Total	16.4	16.4	16.9
Regional Office Whshington Office	.164	.164	.169
Total			
Recommended Source of F	(S-K, Reguler, Contributed,	
Recommended by: Originator R. L. E	. •		<u>Date</u> 8/6/59
Investigation Ch ief	R. L. Edwards		8/6/59
Laboratory Director	Herbert W. Graham	n	8/6/59
Regional Director	Joseph F. Vin	erhar	8/19/59
Branch Chief	JAKE I		12-24-19
Approved by: Division Chief for Di	rector MisH		1-2 (00

Remarks

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Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959 File No.

Research Project Outline

Title of Project	Evaluation of scup a	ging techniques	
	1	ently part of Industrial)	
Investigation Ch	ief: R. L. Edwards	T. A	
Project Leader:	L. M. Lawday R. R. Stoddard	F. A. Stat. Clerk	GS-5 GS-5
Amaintonta (Ma	Nome	$\mathtt{Titl} \epsilon$	Grade

Assistants: (Title and Grade)

William Odum (summer volunteer)

Collaborators:

Paul E. Hamer, N. J. Dept. of Conservation

Need for Information: The determination of growth rates of various groups of scup is necessary prior to management evaluation. Growth rates are required for age composition analyzes, mortality computations and as possible indicators of stock differences. Techniques must be validated.

Objective: To determine best technique for ageing scup.

Method of Procedure:

Phase 1: Comparative study of fin rays, scales and otoliths to determine presence or absence of consistent annual marks.

Phase 3:

Estimated Costs: Tota	l Needed by Laborate	ory for Complete Projec	t <u>2•2</u>
	FY <u>1959</u>	FY <u>1960</u>	FY 1961
Personal Services Other Expenses:	0•5	1.0	
Within Project	0.1	0.1	THE AND
Lab. Adm. & Ser.	0.2	0.3	(C) 100 (C) 10
Lab. Total	0.8	1.4	one sell sells
Regional Office Washington Office	.008	.014	
Total			
Recommended Source of F Estimated Date of Compl	(S•	K, Reguler, Contributed	•
Recommended by: Originator R. I	L. Edwards	Prior	<u>Date</u> 8/6/59
Investigation Ch ief	R. L. Edwards		8/6/59
Laboratory Director	Herbert W Graha	m	8/ 6/59
Regional Director	Joseph & Puns	irchai	8/19/59
Branch Chief	1 HATE		12-24-59
Approved by: Division Chief for Di	rector Allit		1-2-60
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Remarks

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Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Va	lidation of butte	rfish ageing metho	ds.
Investigation Title:	Scup, et al.		
Investigation Chief:	R. L. Edwards	(presently included	in industrial)
Project Leader: R. L.	Edwards	$\begin{array}{c} \text{F.R.B.} \\ \text{Titl} \epsilon \end{array}$	GS-12
Assistants: (Title and		11016	Gr ade
L. M. Lawday			
Collaborators:			
Need for Information:	To determine g	rowth rates of butt	erfish.
	ate the use of th tterfish age.	e otolith as a tool :	for determining
Method of Procedure: Phase 1:		butterfish otolith a y groups and their	

Phase 3:

Estimated Costs: Tota	al Needed by Laborator	ry for Complete Project	2•2
	FY <u>1959</u>	FY <u>1960</u>	fy <u>1961</u>
Personal Services	0.5	0.5	ing sia ne quojilgiikilini.mi.mimijiki kumaliyyikasimikmiyyikase
Other Expenses: Within Project	0.1	0.1	gag and also quantifold decimal leads of the street of the story street is send than
Lab. Adm. & Ser.	0.2	0.8	COST TO SEE SEE SEE SEE SEE SEE SEE SEE SEE SE
Lab. Total	0.8	1.4	
Regional Office Washington Office	.008	.014	
Total			
Recommended Source of I	(S-)	K, Regular, Contributed	
Recommended by: Originator R. L.	Edwards		Date 8/6/59
Investigation Ch ief	R. L. Edwards		8/6/59
Laboratory Director Regional Director	Herbert W. Graham	inta	8/_6 / 59 8/19/59
Branch Chief	() NAE		12-24-59
Approved by: Division Chief for Di	rector Mit		1-2-600
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Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959 File No.

Research Project Outline

Title of Project: Vali	dation of tilefish	ageing techniques	
Investigation Title:	Scup, et al.		
Investigation Chief: R	. L. E dwards (pr	roject presently in	industrial invest.)
Project Leader: L.	M. Lawday	F.A.	GS-5 Grade
Assistants: (Title and	Grade)		
R. L. Edwards	s F.R.B. GS	-12	
Collaborators:			
-	and has suffered to unusual cooling	hly dependant upon extreme mortalitig of the shelf water and it is desired to this fish.	es apparently due rs. It supports
Objective: To be able	e to satisfactorily	determine growth	n rates of tilefish.

Method of Procedure:

Phase 1:

Otoliths, fin rays and scales all offer possibilities for satisfactory ageing. They must be compared, one with the other, to determine which is most satisfactory, and then proper validation studies prepared for publication.

Phase 3:

Estimated Costs: Total	nl Needed by Laborator	ry for Complete Projec	et <u>3•8</u>
	FY 1959	FY <u>1960</u>	FY1961
Personal Services	0.4	0.5	0•5
Other Expenses: Within Project	0.1	0.1	0.1
Lab. Adm. & Ser.	0.3	0.8	
Lab. Total	0.3	1.4	1.6
Regional Office Washington Office	.008	.014	.016
Total			
Recommended Source of I		K, Reguler, Contribut	ed, etc.)
Estimated Date of Comp.	letion: Phase 1 FY59	Phase 2 FY ; Phase ;	3 FY ;Project FY 61
Recommended by: Originator	R. L. Edwards		Date. 8/6/59
Investigation Ch ief	R. L. Edwards		8/6/59
Laboratory Director	^H erbert W. Graham		8/6/59
Regional Director	Joseph G. Vier	uchar	8/19/59
Branch Chief_	214	٤,	12-24-5
Approved by: Division Chief for Di	irector huck		1.1.60
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Remarks

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Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

Research Project Outline

Title of Project:_	Feeding cycl	le of fishes			
Investigation Title	Scup, et a	d. (presen	tly part of indust	tri a l)	
Investigation Chief	R. L. Ed	wards			مد استواده
Project Leader:	R. L. Edwa	ards	F.R.B.	GS-12	
	Name		\mathtt{Title}	Grade	
Assistants: (Title	and Grade)				
R. L. Fritz L. M. Lawd		GS-9 GS-5			

Collaborators:

Need for Information: Some of the species of food fishes involved in southern New England's ground fishery vary markedly in availability throughout the day and throughout the tidal cycle. Preliminary studies indicated that this change in availability was due to periodic feeding habits, associated with the tides and/or change in day light.

Objective: To determine what feeding cycles exist in the local groundfishes.

Method of Procedure: Intensi

Intensive collection of materials (stomachs) over

Phase 1:

at least a 36-hour period in an area where tidal currents are well known. Repeat collections needed to verify tidal influence, and to separate tidal effects

from daylight influence.

Phase 3:

Estimated Casts: To	tal Needed by Laborato		et <u>4.0</u>
	FY <u>1959</u>	FY <u>1960</u>	FY <u>1961</u>
Personal Services	0.5	0•6	0.5
Other Expenses: Within Project	0•2	0.1	0.1
Lab. Adm. & Ser.	0.3	0.7	
Lab. Total	1.0	1.4	1.6
Regional Office Washington Office	.01	.014	.016
Total			
Recommended Source of		K, Regular, Contribute	•
Recommended Source of	(S-		•
Recommended Source of Estimated Date of Com Recommended by:	(S- plotion: Phase 1 FY 59 R. L. Edwards		Project IY 6 Date 8/6/59
Recommended Source of Estimated Date of Com Recommended by: Originator	(S- plotion: Phase 1 FY 59 R. L. Edwards		3 FY ; Project IY 6 Date 8/6/59
Recommended Source of Estimated Date of Com Recommended by: Originator Investigation Chief	(S-pletion: Phase 1 FY 59 R. L. Edwards R. L. Edwards		Project IY 6 Date 8/6/59
Recommended Source of Estimated Date of Com Recommended by: Originator Investigation Chief Laboratory Director	(S-pletion: Phase 1 FY 59 R. L. Edwards R. L. Edwards	Phase 2 FY Phase	Project IY 6 Date 8/6/59 8/6/59 8/6/59

Remarks

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Sheet No. 1

Phase 2:

Location: Woods Hole, Mass. Date: August 6, 1959 File Ne.

Research Project Outline

Title of Project:	Age	and growtl	n of scup	of southern I	New Englar	ıd	
Investigation Tit	: lo:	Scup et al .					national desiration of the second
Investigation Chi	of:	R. L. Edv	vards (Pre	e sen tly proj.			
Project Lander:	L. M	. Lawday	and R. R.	Stoddard	L awda y Stoddard	FA GS-5 Stat. Clerk Grade	GS-5
: Assistants: (Tit	le and	Grade)					
R. L. Ed	wards	F.R.B	GS-12				
Cellaboraters:							
Need for Informating or				needed to a age compos		ect s of n ortal ity rate	es.
Objective:	T o do c	cument the obser		rowth of scu	up and the v	variations	
Method of Procedu Phase 1:	re:	Standard	, back cal	culations, e	tc.		

Scup 7	Shcet	No.	2
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Method of Procedure: (Cont'd)

Phase 3:

Estimated Casts: Tota	l Needed by Laboratory	for Complete Preject	10.8
	FY <u>1959</u>	FY <u>1960</u>	FY <u>1961</u>
Personal Services Other Expenses:		and made impacts	1.0
Within Project	COO COO 200 NOOT TOO COO COO COO COO COO COO COO COO		0.2
Lab. Adm. & Ser.			1.5
Lab. Total			2•7
Rogional Office Washington Office			.027
Total			
Recommended Source of F . Estimated Date of Compl.	(S-K,	Regular, Contributed,	· · · · · · · · · · · · · · · · · · ·
Recommended by: Originator	R. L. Edwards		Date 876759
Investigation Chief	R. L. Edwards		8/6/59
Laboratory Director	Herbert W. Graham		8/6/59
Regional Director_	Joseph 4. Ver.	when	8/19/59
Branch Chief	WHE.		12-24-59
Approved by: Division Chief for Dir	rector Alte		1-2 60

Remarks

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Question Staff Time available?

Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959 File No.

Research Project Outline

Title of Project: Age and growth of s	outhern New Englar	ıd butterfish	
restigation Title: Scup, et al. (Proj. is part of industrial at present)			
Investigation Chief: R. L. Edwards			
Project Londor: R. L. Edwards	F.R.B. Titl ϵ	GS-12 Grade	
: Assistants: (Title and Grade)			
L. M. Lawday F.A. GS-5			

Collaborators:

Need for Information: Southern New England's butterfish appears to be an essentially unexploited group of fish. Preliminary work indicates that largest market category is made up of 3 or 4 year old fish. Age and growth data will enable an evaluation of effect of fishery on this species.

Objective: To document the growth rate and its variations in southern New England butterfish.

Method of Procedure: Standard. Otolith readings, and possibly back calculations using otoliths. A short research report is planned.

Phase 1:

Scup 8 Sheet No. 2

File No.:

Mothod of Procedure: (Cent'd)

Phase 3:

Estimated Casts: Total	l Needed by Laboratory	for Complete Preject	10•3
	FY <u>1959</u>	FY <u>1960</u>	FY1961
Personal Services Other Expenses:		22 mm ***	1.0
Within Project	illis unt milli Anne innernet unter eine eine eine eine eine eine eine ei		0.2
Lab. Adm. & Ser.	Cord and resident		1.5
Lab. Total			2.7
Regional Office Washington Office			.027
Total	The state of the s		
Recommended Source of Fu	(S-K,	Regular, Contributed,	·
Recommended by: Originator R.	L. Edwards		Date 8 /6/39
Investigation Chief	R. L. Edwards		8/6/59
Laboratory Director	Herbert W. Graham		8/6/59
Regional Director	Joseph & Pune	ahan	8/19/59
Branch Chief Approved by:	ME		12-24-59
Division Chief for Dire	ector_Nit		1-2-60

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Sheet No. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Age and growth of tilefish
Investigation Title: Scup and other middle Atlantic groundfish
Investigation Chief: R. L. Edwards (presently part of Industrial Invest.)
Project Loader: L. M. Lawday F. A. GS-5 Name Title Grade
Assistants: (Title and Grade) R. R. Stoddard, Statistical Clerk GS-5 R. L. Edwards, Fishery Research Biologist, GS-12
Collaborators:
Need for Information: The age composition of tilefish populations needs to be determined so that the Laboratory will be in a position management procedures if necessary.
Objective: To determine growth rates and their variations.

Method of Procedure:

Phase 1: Following validation, use best technique to age fish. Some research vessel cruises are required to collect material.

Phase 2: Start in 1961.

Phase 3:

Estimated Costs: Tota	70 50	7060	7.067
	FY <u>1959</u>	FY 1960	FY196 1
Personal Services			0•5
Other Expenses: Within Project	And the state of t		0•2
Lab. Adm. & Ser.	continued to the second		0.3
Lab. Total			1.0
Regional Office Washington Office			.01
Total			
	(,	Regular, Contribute	y (00)
	·		•
Recommended by: Originator	etion: Phase l FY 61; P		Project IY
Recommended by:	etion: Phase l_Fy6l ; p		Project IY (Date 8/6/59
Investigation Chief Laboratory Director Regional Director Branch Chief	R. L. Edwards R. L. Edwards R. L. Edwards Herbert W. Graham		Date 8/6/59 8/6/59
Recommended by: Originator Investigation Chief Laboratory Director Regional Director	R. L. Edwards R. L. Edwards R. L. Edwards Herbert W. Graham	hase 2 FY ; Phase ;	Project IY 6 8/6/59 8/6/59 8/6/59
Recommended by: Originator Investigation Chief Laboratory Director Regional Director Branch Chief Approved by:	R. L. Edwards R. L. Edwards Herbert W. Graham	hase 2 FY ; Phase ;	Project IY 6 8/6/59 8/6/59 8/6/59
Recommended by: Originator Investigation Chief Laboratory Director Regional Director Branch Chief Approved by:	R. L. Edwards R. L. Edwards R. L. Edwards Herbert W. Graham Hector M. H. Pune	hase 2 FY ; Phase ;	Project IY 6 8/6/59 8/6/59 8/6/59

Sheet Mo. 1

Location: Woods Hole, Mass. Date: August 6, 1959
File No.

Research Project Outline

Title of Project: Skate ageing techniques
Investigation Title: Scup (et al) presently part of Industrial
Investigation Chief: R. L. Edwards
Project Loader: Vacant Name Title Grade
Assistants: (Title and Grado) L. M. Lawday, Fishery Aide, GS-5
Cellaboraters:
Need for Information: Skates constitute a small but significant percentage of the industrial landings. Their loss to the fishery would be only slightly felt, however little is known about the life history of this species and age-growth data for skates is required before any intelligent management procedures may be devised.
Objective: To enable the determination of growth rates of various species of skates
Method of Procedure:

Phase 1:A study of fin spines, etc., and vertebral faces to determine whether or not it is feasible to age these fish. The Japanese have successfully used histological techniques (sections of the vertebrae) to age skates.

Phase 3:

Estimated Costs: Total Needed by Laborator	y for Complete Projec	ct <u>15•5</u>
FY 1959	FY <u>1960</u>	FY 1961
Personal Services	Dec 440 AG	0.5
Other Expenses: Within Project	as as as	0.1
Lab. Adm. & Ser.		1.0
Lab. Total		1.6
Regional Office Washington Office		.016
Total		
Recommended Source of Funds (S-K Estimated Date of Completion: Phase 1 FY 61;	Regular, Contribute	•
Recommended by: Originator R. L. Edwards	Thase Z FI Thase	Date 8/6/59
Investigation Chief R. L. Edwards		8/6/59
Laboratory Director Herbert W. Graham		8/6/59
Regional Director	rencha	8/19/59
Branch Chief V Approved by:		
Division Chief for Director		

Remarks

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